THESIS

DETERMINANTS OF SMALL BUSINESS LENDING

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ABSTRACT

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The aim of this paper is to determine the factors that drive banks' decisions to provide loans to small informationally opaque enterprises. This paper combines three important aspects related to small business lending – asymmetry of information, bank efficiency, and regional economic performance – and hopes to establish the complex ties between them and understand how banks can use the information available for the benefit of SMEs, and ultimately regional growth.

TABLE OF CONTENTS

1. Introduction

Small business has become an important research topic for economists and policymakers working on economic development and regional growth. Its importance and significance is due to the fact that small businesses are the fundamental basis for building a competitive environment, as well as the basis for forming a middle class society. The small business sector provides flexible and fast satisfaction of consumer needs; it serves as an effective tool for resolving social and economic problems both at national and regional levels. Small businesses create 50% of GDP[1], provide jobs for more than half the population of Western Europe and the U.S.[2], make a significant contribution to the export potential, facilitate implementation in manufacturing the latest achievements of science and technology, and so on.

The role of financing is particularly important in supporting small firms. "SMEs tend to be more financially constrained than large firms and the lack of access to finance is an important obstacle to their growth. In particular, SMEs find it difficult to obtain external financing from banks and capital markets given their size and characteristic opaqueness.[3]" Banks financing SMEs face difficult financial constraints due to the lack of accurate reliable information on the

[1] "The Small Business Share of GDP, 1998-2004, Kathryn Kobe, Small Business Research Summary, 2007.
[2] Ayyagari, Meghana, Thorsten Beck, and Asl Demirg-Kunt (2007), "Small and Medium Enterprises across the Globe", Small Business Economics 29:415-434.
[3] Drivers and Obstacles to Banking SMEs: The Role of Competition and the Institutional Framework, Augusto de la Torre, Maria Soledad Martinez Peria, Sergio L. Schmukler, 2009

financial condition and performance of small firms. In particular, banks usually hesitate to finance startups and young firms, those with insufficient collateral, or firms which demonstrate the possibilities of high returns but at a significant risk of loss. Despite efforts by financial institutions and public-sector bodies to close funding gaps, SMEs continue to experience difficulty in obtaining needed capital (K. Dietrich, 2003).

The aim of this paper is to determine the factors that drive banks' decisions to provide loans to small informationally opaque enterprises. This paper combines three important aspects related to small business lending – asymmetry of information, bank efficiency, and regional economic performance – and hopes to establish the complex ties between them and understand how banks can use the information available for the benefit of SMEs, and ultimately regional growth.

In regard to the first aspect, the lack of hard information about SMEs creates asymmetry of information between banks and small enterprises. For example, "a lack of audited financial statements prevents banks from engaging in what is known as financial-statement lending, by which the loan contract terms are set on the basis of the company's expected future cash flow and current financial condition as reflected in audited statements" (Berger and Udell, 2006). Other lending technologies, such as business credit scoring, asset-based lending, and factoring, also need hard information on the SMEs. Therefore, it is important for banks to be able to find available information, which can be used as a proxy

for measured entrepreneurial performance when it is difficult to get hard information on them.

Specifically, this paper tests hypotheses about the effect of entrepreneurial information regarding firm turnover available in the region and small business density on the amount of lending to small businesses. This paper tries to find out whether the information that banks can get about the number of firms established in the particular county and the number of closeouts per county influence the distribution of loans to SMEs in a particular county. Thus, banks can make their lending decisions knowing already the history of successes and failures of small businesses in a particular county and in particular industries. This gives them more insight on the level of lending risk in the county and answers the question of whether a particular sector or industry in this county can be successful.

Also, along with entrepreneurial information in the region, the economic conditions in a particular county matter. For example, a county with a high income, population, and level of human capital has a higher probability of being more business active than the counties with these characteristics being low.

Furthermore, bank financial distress may be an important determinant of loan availability. “Healthy” banks are better able to provide loans to young, small firms with risky projects than are less healthy banks. These banks’ profits are high enough to offset losses associated with lending to small businesses. All

these factors need to be taken into account when analyzing bank lending to SMEs.

Another issue that this paper examines is the relationship between the degree of small bank competition in local geographic banking markets and the total volume of small business lending in those markets. This paper tests whether increases in competition in a banking market would be expected to be associated with increases in small business loan volume in a county.

The novelty of this paper lies in the regional character of the modeling. This paper is going to investigate how factors and their influence on the small business lending change across different geographical levels. Specifically, we will split the geography down to metro, micro, and rural counties in order to uncover the effect of the size and geography factor in the small business lending. This data split allows us to find out whether the factors that influence SME lending in metro counties will have the same impact on the lending practices in the rural counties and vice versa.

This research tries to shed light on all these issues through testing the hypotheses using a rich data set provided by the Federal Reserve Bank. It contains information on counties' economic conditions, entrepreneurship density, their loans, and the Call-report data for all banks across the regions. In all, the hypotheses are tested using US county data from 1999–2007, representing a mixture of economic conditions at the county level.

Section 2 reviews the problem of asymmetry of information, the role of the bank competition, and bank distress-related problems in small business lending. Section 2 also reviews the existent empirical literature that is related to our research hypotheses. Section 3 describes the data set and presents the methodology used to test hypotheses. Section 4 presents our empirical findings, and conclusions are presented in Section 5.

2. Literature Review

One of the issues in this paper is to study the problem of information asymmetry and its effect on small business lending. Consider the market where two qualities of a good are offered. Buyers and sellers in the same manner arrange their preferences in terms of products of varying quality, but only sellers know the quality of each individual good; buyers in the best case know only the distribution of the quality of previously sold goods. If buyers cannot in any way distinguish good goods from bad goods, then, along with high-quality products, they will always find bad-quality products as well. Such a market is an illustration of the problem of adverse selection, and was introduced by Akerlof in his paper "The Market for Lemons." He analyzed a market where buyers are unable to distinguish between high-quality and low-quality used cars—lemons. Also, Akerlof showed that the same problem arises in credit markets. Taking into account the problem of adverse selection, the main instinct of every bank official is to try not to lend to the firm that may be low-quality, that is firms in which the bank lacks a sufficient amount of information about its credibility.

This paper tries to find out how banks can overcome the problem of informational asymmetry when lending to local small businesses or even to start-up companies. The research focuses on regional bank lending, trying to explain why SMEs in some counties receive more loans than SMEs in other counties, as

well as, what factors can influence this geographic asymmetry of small loans distribution.

A similar problem was discussed previously in the paper of Lang and Nakamura "The Model of Redlining" (1993). This paper shows how information externalities can lead to inefficient credit rationing in low-volume markets. They develop a model of mortgage redlining, which captures the dynamic information gathering[4]. This is implied by the use of appraisals in mortgage granting. In their model, the precision of appraisals depends on the quantity of previous home sales. In a neighborhood with a large number of recent home sales, bank appraisals are more precise than in the neighborhood with few recent home sales. Lenders require larger down payments in the neighborhood with inaccurate appraisals. There is thus a dynamic information externality in which past purchases influence current purchases. What this shows is in markets with a greater amount of previous information available regarding economic activity, there is also a greater volume of loan origination in that geographic area. Banks and lending institutions see this previous information regarding economic success and failure as a signal for loan determination.

This notion of information externality was extended further by Michael Barr (2005). In his paper, he had shown how information externalities can produce credit constraints that affect creditworthy borrowers in "thin" markets. He defines "thin" markets as markets with a relatively lower level of economic activity. He

[4] "The model of redlining", Lang William W., Nakamura Leonard I., Journal of Urban Economics, Volume 33, 1993

showed that borrowers in low-income neighborhoods find it more difficult to obtain mortgage loans in part because lenders lack sufficient information on home sales in these "thin" markets. He has also explained how these informational problems can lead to a situation where creditors delay entry into low-income markets. Moreover, "neighborhood externalities exacerbate these barriers, as do agency problems in financial institutions and in the market more broadly. Low-income markets can become stuck, with low volume and liquidity blocking creation of a complete market.[5]"

This paper proposes a similar dynamic externality in the context of SMEs funding decisions. It attempts to find available information that can be used by banks as a proxy for measured credibility and riskiness of informationally opaque SMEs. Specifically, this paper tests hypotheses about the effect of entrepreneurial information regarding firm turnover available in the region on the amount of lending to small businesses. In this research we are using births (new firm opening), deaths (firms that went out of business), and the SME density as a proxy for variables that may reduce informational asymmetry in the region and help bank analysts to make decisions in their lending practices.

Another important question related to the problem of small business lending is which kind of banks do in fact lend to small firms. Many articles have been written regarding the impact of a bank size on the amount of loans given to small firms. For instance, there are many papers aimed to study effects of bank

[5] "Credit where it counts: the community reinvestment act and its critics", Michael S. Barr, 2005

consolidation through studying the role of the size of the bank in providing loans to small businesses. Economists monitored the lending activity of banks before acquisitions and after to find out how the size of the bank is correlated with lending to SMEs. Avery and Samolyk (2004), Sapienza (2002), Berger (2001), Levonian and Soller (1996) concluded that larger banks are less likely to provide small business loans than banks with less capital. The main argument for this is that small banks are able to lend to small businesses at a lower cost than large banks. If larger banks suffer from higher costs of making relationship loans, then the new bank formed by the merger or acquisition should give fewer small business loans after the consolidation. Consistent with this prediction, Berger et al. (1998) found that "after a merger, the new bank originates fewer small business loans than the independent banks prior to the merger." According to Berger, "Small banks have comparative advantages in lending to the smallest, least informationally transparent firms using lending technologies based primarily on 'soft' qualitative information, while large banks tend to specialize in lending to larger firms using technologies based more on 'hard' quantitative information." Carter, McNulty, and Verbrugge in their research also suggest that small banks have an information advantage in evaluating credit. Also, Nakamura (1994) suggests that "small banks appear best able to lend to local small businesses because small banks have the ability to closely monitor these firms, and their tight organizational structures enable them to effectively use the resulting

informational advantage.[6]" All these results are consistent with the research presented by Petersen and Rajan (1995). They showed that asymmetry of information induces banks to build relationships with the borrowers. These relationships increase credit availability, in particular to the youngest and informationally opaque borrowers[7].

Banking concentration is another issue related to small business lending. There are two countervailing hypotheses about the influence of banking competition on the amount of SME lending. A first hypothesis suggests that banks with market power should guarantee more industry entry and more SME loans than competitive banks. According to Cetorelli, lending to small opaque firms requires that the bank and the borrower build a long-term relationship. However, "banks can sustain the cost of starting a relationship with unknown, risky entrepreneurs only if market power allows them to recoup the cost at later stages if such entrants turn out to be successful." This idea was tested by Petersen and Rajan, who argued that banks with greater market share can get a high enough profit from high-quality borrowers to offset losses from small opaque businesses. Therefore, this suggests that banks with market power should guarantee more industry entry and larger amount of loans to SMEs than competitive banks.

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[6] Nakamura, Leonard I., 1994. "Small Borrowers and the Survival of the Small Bank: Is Mouse Bank Mighty or Mickey?," Federal Reserve Bank of Philadelphia Business Review, November/December, 3-15.

[7] Petersen, M. and Rajan, R. (1995), 'The effect of credit market competition on lending relationships', Quarterly Journal of Economics 2(110), 407–443.

The second countervailing hypothesis suggests that in markets with a less competitive banking environment, potential entrants or existing SMEs face greater difficulty gaining access to credit than markets in which banking is more competitive. This hypothesis was tested by Cetorelli and Strahan (2006), who found that market power may reduce the entry of small firms to the market. Banks with market power will be more willing to lend to their established borrowers than to the new borrowers. “The value of a bank’s current lending relationships will depend on the future profitability of its borrowers, which in turn depends on prospective entry and growth of new competitors. A bank’s incentive to support the profitability of its older clients could thus restrain its willingness to extend credit to potential industry entrants (or emerging small firms).” By testing this hypothesis, Cetorelli and Strahan confirmed that the less competitive the conditions in the credit market, the lower the incentive for lenders to finance start-ups or informationally opaque SMEs.

However, not only the amount of available information in the region or degree of bank competition affect the number of loans to SMEs, but a bank’s performance by itself matters. Another hypothesis that was tested by the economists is that banks in the state of financial crisis have little chance of providing loans to small businesses. These banks would reduce lending volumes for potentially risky firms with high information asymmetry.

According to Kimball, successful bank operation requires managers to weigh complex trade-offs between growth, return, and risk. In recent years banks

have increasingly adopted innovative performance metrics, which assist managers in making these difficult and complex decisions. Among the large set of measures for banks' performances, a distinction can be made between traditional, economic, and market-based measures of performance.

Traditional performance measures are return on assets (RoA), return on equity (RoE), cost-to-income, and net interest margin. For example, Revell (1980) uses the interest margin as a performance index for U.S. commercial banks. He defines the interest margin as the difference between interest income and expense divided by total assets[8].

Economic measures of performance reflect the economic profit generated by a firm, in contrast to the firms accounting earnings. The most commonly cited indicators here are economic value added (EVA), developed by Stern and Stewart in 1991, and risk-adjusted return on capital (RAROC). First measure, EVA, "takes into account the opportunity cost for stockholders to hold equity in a bank, measuring whether a company generates an economic rate of return higher than the cost of invested capital in order to increase the market value of the company."[9] The second measure, RAROC, was first implemented by Banker's Trust and it can be described as the excess return on the market per unit of market risk. Similar to EVA, this measure takes into account the bank's cost of capital. However, RAROC goes further because it adjusts the value-

[8] Measurement of bank performance in Greece, Kyriyaki Kosmidou, Constantin Zopounidis, South-Eastern Europe Journal of Economics 1 (2008) 79-95

9 "Beyond ROE- how to measure bank performance", Report of European Central Bank, 2010

added in relation to the capital needed. Unfortunately, it is difficult to calculate RAROC without having access to internal data.

Market-based measures of performance characterize the way the capital markets value the activity of any given company, compared with its estimated accounting or economic value. The most commonly used measures include "price-to-earnings ratio", "price-to-book value", "total share return", "credit default swap".

Despite the continuous use of financial ratios for analysis of banks' performance, federal regulators in USA developed the CAMEL rating system, which is capable of showing the over-all performance of a bank. In 1979, the Uniform Financial Institutions Rating System was adopted to provide federal bank regulatory agencies with a framework for rating financial condition and performance of individual banks. Since then, the use of the CAMEL factors in evaluating a bank's financial health has become widespread among regulators.[10]

The CAMEL rating system was developed by federal banking regulators as a composite measure of overall commercial bank performance.[11] The CAMEL acronym stands for Capital adequacy, Asset quality, Management, Earnings, Liquidity, and Sensitivity.

Several academic studies have examined whether CAMEL model is useful for determining the performance of a bank. Most of these studies conclude that

[10] CAMELs and Banks Performance Evaluation: The Way Forward, Wirnkar Alphonsius Dzeawuni Sr., Dr. Muhammad Tanko II, June 24, 2008
[11] Efficiency Ratios and Community Bank Performance, Fred H. Hays, Stephen A. De Lurgio, Arthur H. Gilbert, Jr.

CAMEL ratings are highly useful in the supervisory monitoring of bank conditions.[12] This paper will use approximate CAMEL variables in order to measure bank performance in different counties.

After examining the existing literature it is necessary to uncover the link between market "thickness" in terms of economic activity, address the importance of small banks competition in the lending process, and finally the importance of bank performance in the adequate functioning of loan distribution.

[12] Jose A. Lopez, 1999. "Using CAMELS ratings to monitor bank conditions," FRBSF Economic Letter, Federal Reserve Bank of San Francisco, issue Jun.

3. Data and Empirical Model

Data on small business finance are scarce. One of the few available sources is the National Survey of Small Business Finance (NSSBF), a nationally representative sample of non-financial, non-farm small businesses sponsored by the Board of Governors of the Federal Reserve System and the U.S. Small Business Administration.[13]

This paper uses data for U.S. commercial banks over the period of 1999 through 2006 from the FDIC's Report of Condition and Income (Call Reports), made available from the Federal Reserve Bank. The Call Report is used as the source for loans to small businesses, which are defined as commercial loans with original amounts less than one million dollars.

Following Nakamura (1994) this paper categorizes banks with assets greater than $1 billion as large banks and those with assets less than $1 billion to be small banks. Due to all previous studies on the role of small and large banks in lending to SMEs, the decision in this study is to focus on small bank lending. Specifically, “because big banks are run from afar, it is expensive for them to obtain the qualitative information about risk that local bankers pick up naturally by being part of the community and interacting with borrowers.”

The data for the paper was stratified by region: metro, micro, and rural counties. In addition, those banks with missing or unusable data were eliminated

[13] How important are small banks to small business lending?: New evidence from a survey of small firms Jith Jayaratne[a] and John Wolken

from the sample. The data includes 35,442 small banks, of which 3,686 banks were located in metro counties, 12,739 in micro counties, and 19,017 in rural counties. Other regional data that was used as control variables in the model can be categorized as data representing economic the condition of the county and market “thickness” indicators.

3.1. Control variables

This paper includes a number of variables to control for the factors that could affect the amount of small business loans. These variables and the rationale for including them in the analysis are presented below.

3.2. Regional economic and banking conditions

This paper uses U.S. county data, representing a mixture of economic and banking conditions in the county level: population, income per capita, human capital, number of banks, the amount of deposits per capita, and the amount of assets per capita. Income and population data were collected from the Bureau of Economic Analysis.

This paper uses years of schooling as a proxy for human capital. This technique was introduced by George W. Hammond and Eric C. Tompson in 2007. “Years of schooling in a county are calculated based on high school and college attainment rates from the Census of Population. In particular, years of schooling are computed by multiplying the share of the population (age 25 and older) with a

given level of educational attainment by the assigned years of schooling. College graduates or higher are assigned 17 years of schooling, while high school graduates who did not complete college were assigned 13 years of schooling, and persons who did not complete high school were 10 years of schooling. These weighted years of schooling are then summed for the county.[14] "The data was collected for the year 2000 from the U.S. Bureau of the Census website.

Another variable, the "assets," is calculated as the sum of all the banks' assets in the county divided by the population. This paper uses dividends per capita as a substitute for the assets in the second run of the regressions to see whether short term liability affect bank propensity to lend. The "number of banks" variable is the total number of banks operating in the county. It was normalized by the number of small business establishments per county.

3.3. Market "thickness"

The main purpose of this study is to explore the determinants of information externality on the county level, and how these externalities affect small business lending. This paper tests the hypothesis that markets with a greater amount of information available regarding previous economic activity will receive also a greater volume of loan origination in that county. Births (new firm openings) and deaths (firms that went out of business) of small businesses are used as a proxy for variables that have to reduce informational asymmetry in the

[14] "Determinants of Income Growth in Metropolitan and Non-Metropolitan Labor Markets", George W. Hammond, Eric C. Tompson, 2007

region and help bank analysts to make decisions in their lending practices. These measurements were taken from the Census and normalized by the number of firms in the county–BIRTHNORM=Births/Firms and DEATHNORM=Deaths/Firms. Another variable that was used in the analysis is the number of small businesses normalized by the population. This variable describes the density of SMEs by the population in the county, which may be used to determine the degree of market "thickness."

3.4. Banks' loan performance factors

We used the charge-off ratio as a measure of banks' portfolio performances that might affect management incentives in making and pricing loans to the informationally opaque small businesses. The charge-off ratio is the ratio of the total amount of loans written off during a period to the total outstanding amount of loans at the end of the period. It shows how "successful" the bank is in its risk management practice. More precisely, it measures what part of given loans is unlikely to be collected.

Here the hypothesis tests the idea that banks with low portfolio performance coefficients are risk adverse in practice and issue fewer loans to risky businesses because of the bank's unstable financial situation and inability to cover the charge-offs that might occur from these risky projects. However, there is also the possibility of risky management practice in the same situation. These practices favor a higher amount of risky loans because of their higher

expected returns. For the purpose of this paper we will focus primarily on the risk adverse behavior, while still examining both possibilities. All data for the calculation of the Charge-off ratio were taken from FDIC's Report of Condition and Income (Call Reports), 1999-2006.

Another variable that was used in this paper is Performance Index. It utilizes linear multivariate efficiency ratios. In addition to profitability as measured by return on average assets, other important variables include salaries to average assets, the liquidity ratio, the equity capital to asset ratio, and loan charge-offs to loans. The final linear discriminant model contains the following five ratios:

$Z = \propto + \beta_1 E2TA + \beta_2 NCO2L + \beta_3 SalAA + \beta_4 ROAA + \beta_5 LiqR$, where:

α = Constant

E2TA= Equity Capital to Total Assets

NCO2L= Net Loan Charge-offs to Loans

SalAA= Salaries and benefits to Avg. Assets

ROAA= Return on Average Assets

LiqR= Liquidity ratio

3.5. Time period effects

Because bank performance and lending practice varies over the business cycle, we control for potential differences by including separate dummy variables for each year.

3.6. Descriptive statistics

The sample includes 3,110 counties, of which 1,062 are metro counties, 676 are micro counties, and 1,372 are rural counties. Table 1 presents the descriptive statistics of the variables in the regression:

Table 1

Variable	Mean	Median	St. Dev.	Max	Min
Economic conditions					
Income per capita	25059.67	24018	6554.2	119141	451
Population	101450	25191.5	577099.5	34440167	45
Human Capital/Population	0.208	0.21	0.024	0.994	0
Total Assets	2919445	181165.	4788400	2561386761	0
Number of banks/Number of SMEs	0.0001	0.00005	0.00017	0.00214	0
Unemployment rate	5.23	5	2.07	30.6	0
Market "thickness" factors					
Firm Births	241	52	866.94	29971	0
Firm Deaths	218	50	773.14	25160	0
SMEs per county (F)	2294	549	7594.9	238829	0
Birthnorm=B/F	0.1	0.09	0.029	0.5	0
Deathnorm=D/F	0.09	0.09	0.027	0.66	0
Number of loans $250,000 through $1,000,000	113.53	9	793.41	50165	0
Amount of loans $250,000 through $1,000,000	34198.3	2708.5	237574.5	9571065	0
Number of banks/Number of SMEs	0.000114	0.00005	0.00017	0.00214	0
Amount of loans $250,000 through $1,000,000/Number of SME	10.3	3.84	21.7	801.69	0
Number of loans $250,000 through $1,000,000/Number of SME	0.03	0.01	0.08	5.3	0
SME/Population	0.0235	0.0226	0.078	0.097	0
Banks' loan performance factors					
Charge-Off Index	0.16	0.0024	9.211	0.99	0
Performance index	0.24	0.35	2.76	5.93	0

Table 2, Table 2, and Table 4 present descriptive statistics for metro, micro, and rural counties respectively.

Table 2
Summary Statistics for Metro Counties

Variable	Mean	Median	St. Dev.	Max	Min
Regional economic and banking conditions					
Income per capita	28334.88	26978	7605.3	111346	451
Population	247892.5	92527	969528.4	34440167	1699
Human Capital/Population	0.203	0.206	0.024	0.99	0.0038
Number of banks/Number of SMEs	0.00005	0.00002	0.000078	0.00078	0
Total Assets	8039647.8	399143	81695378	2561386761	0
Unemployment rate	4.8	4.7	1.7	30.1	0
Market "thickness" factors					
Firm Births	595.3	212	1407.78	29971	0
Firm Deaths	534	193	561	25160	0
SMEs per county (F)	2294	549	7594.9	238829	0
Birthnorm=B/F	0.1	0.1	0.02	0.3	0
Deathnorm=D/F	0.09	0.09	0.01	0.56	0
Number of loans $250,000 through $1,000,000	294.05	32	1336.3	50165	0
Amount of loans $250,000 through $1,000,000	88551.82	9684	400389.3	9571065	0
Amount of loans $250,000 through $1,000,000/Number of SME	10.3	3.84	21.7	801.69	0
Number of loans $250,000 through $1,000,000/Number of SME	0.036	0.016	0.1	5.3	0
SME/Population	0.019	0.017	0.005	0.032	0
Banks' loan performance factors					
Charge-Off Index	0.26	0.003	12.92	1.1	0
Performance index	0.23	0.35	3.87	5.93	0

Table 3
Summary Statistics for Micro Counties

Variable	Mean	Median	St. Dev.	Max	Min
Regional economic and banking conditions					
Income per capita	24310	23850	5155	119141	9262
Population	45649	38237	49107	1158277	405
Human Capital/Population	0.205	0.207	0.02	0.28	0.008
Total Assets	471349.4	259763	1250568.4	25428432	0
Number of banks/Number of SMEs	0.00008	0.000051	0.00012	0.001372	0
Unemployment rate	5.34	5.2	2.05	25	0
Market "thickness" factors					
Firm Births	103.67	79	165.8	4451	0
Firm Deaths	97	77	135.8	3385	0
Firms per county (F)	1098	904	1309.8	32043	3
Birthnorm=B/F	0.09	0.08	0.023	0.5	0
Deathnorm=D/F	0.08	0.086	0.02	0.57	0
Number of loans $250,000 through $1,000,000	38	15	107.48	4264	0
Amount of loans $250,000 through $1,000,000	11261.3	4709.5	25101.9	615088	0
Amount of loans $250,000 through $1,000,000/Number of SME	10.94	5.59	18.92	343.84	0
Number of loans $250,000 through $1,000,000/Number of SME	0.035	0.018	0.06	2.14	0
SME/Population	0.00025	0.000132	0.00051	0.01	0
Banks' loan performance factors					
Charge-Off Index	0.19	0.35	3.39	1.67	0
Performance index	0.32	0.002	11.31	0.57	0

Table 4
Summary Statistics for Rural Counties

Variable	Mean	Median	St. Dev.	Max	Min
Regional economic and banking conditions					
Income per capita	22893.8	22323.5	5122.6	100711	5355
Population	15589.8	11697.5	26364.04	840785	45
Human Capital/Population	0.214	0.215	0.024	0.39	0.1
Number of banks/Number of SME	0.00018	0.00013	0.000225	0.002141	0
Total Assets	162343.1	100131	250106.7	7058741	0
Unemployment rate	5.5	5.1	2.27	30.6	0
Market "thickness" factors					
Firm Births	35.36	23	86.31	3208	0
Firm Deaths	34	24	72.57	2526	0
Firms per county (F)	365.33	262	693.2	24098	0
Birthnorm=B/F	0.09	0.09	0.034	0.66	0
Deathnorm=D/F	0.09	0.09	0.035	0.66	0
Number of loans $250,000 through $1,000,000	10.98	2	24.77	830	0
Amount of loans $250,000 through $1,000,000	3427.08	368.5	7516.48	233549	0
Amount of loans $250,000 through $1,000,000/Number of SME	9.6	1.38	20.6	636.37	0
Number of loans $250,000 through $1,000,000/Number of SME	0.03	0.005	0.067	2.26	0
SME/Population	0.024	0.023	0.009	0.097	0
Banks' loan performance factors					
Charge-Off Index	0.007	0.001	0.028	0.76	0
Performance index	0.27	0.35	0.15	0.61	0

The metro counties in the sample have on average of $88.5 million in total loans to SMEs from the small banks, micro counties have $11 million, and rural counties have $3.4 million in total loans. However, the median level of loan

amount in metro counties is $9.7 million, in micro counties it is $4.7 million, in rural counties it is $0.36 million. This reflects a skewed distribution of small business loans. The average number of small business loans per year is 294 for metro counties, 38 for micro counties, and 11 for rural counties. Also, approximately 55% of the sample banks are located in metropolitan areas, 18% in micro counties, and 27% in rural counties.

4. Summary of Hypotheses

Using these data, we tested the following hypotheses. The first test tries to examine the relationship between the degree of bank competition in local geographic banking markets and the volume of SME lending in those markets.

It is conventional wisdom to believe that greater competition is associated with a greater supply and lower prices; specifically, higher number of banks in the market is associated with higher small business loan volumes and lower interest rates. However, some studies have results that show that it is not always the case. In particular, Petersen and Rajan (1995) found that for young small businesses, increases in the concentration of the banking market in which the firm was headquartered reduced the firm's loan interest rate. But, if they were older, increases in concentration increased their loan interest rate. This suggests that if a small business is young enough, increases in concentration increase its loan amount, but that if it is older, the loan amount falls. This result does not tell us, however, whether on average, increases in competition in a banking market would be expected to be associated with increases or decreases in small business loan volume in the market as a whole.

To evaluate the relationship between competition and lending more carefully, we conducted a regression analysis to control more for the age of SMEs, specifically for the number of start-ups in a county. These variables were normalized by the number of small businesses. The regression also controlled for

other variables that may influence small business loan volume, such as general economic conditions of the county, which are measured by income, population, human capital, and unemployment rate. All these variables were included in the model that tries to test the hypothesis, which seeks to uncover the correlation between banks' competition and SMEs lending. Specifically, this suggests that small firms in areas with few small banks should be more credit constrained and receive smaller amounts of loans than small businesses in the counties with more small banks. Also, regions with a robust network of small local banks should have significantly more small firms and a larger amount of loans than regions with a few small banks.

The second hypothesis deals with the notion of asymmetry of information and market "thickness." A large number of articles have shown that asymmetric information may prevent the efficient allocation of lending, leading to credit rationing and living behind the most informationally opaque borrowers—SMEs and start-ups. The paper argues that in markets with a greater amount of previous information available regarding economic activity there is also a greater volume of loan origination in that geographic area. Banks and lending institutions see this previous information regarding economic success and failure as a signal for loan determination. It implies that counties with a high level of small business economic activity should be more likely to obtain credit from banks than counties with economic activity being low. This paper uses the number of start-ups and the number of close-outs of SMEs as a proxy to measure the level of economic

activity. Specifically, the paper tests whether a larger volume of small business activity in the county leads to a larger volume in SME lending.

The third test examines the distribution of loans from financially distressed banks. The hypothesis states that counties with banks in financial distress receive relatively smaller amounts of loans to SMEs than counties that have banks with better financial performance. There are two countervailing forces when dealing with this issue. On the one hand, small banks in distress may become more risk adverse and will not be willing to lend to potentially risky SMEs. On the other hand, these banks may want to increase their profits by investing in risky projects that require a higher interest rate, thus providing more profit to financially distressed banks. This paper uses two variables that measure the financial condition of the bank. The first index is a Performance Index. It utilizes linear multivariate efficiency ratios. The hypothesis stated in this paper implies that banks with a higher performance index will be more willing to lend to small businesses or start-ups because they can afford to offset the losses from these risky projects.

The second variable that is used as a proxy for measuring the financial performance of the bank is a Charge-Off ratio. This index measures the gross credit loss of a loan portfolio over a specified period of time. Our hypothesis suggests that the banks with this ratio being low will lend more to the SMEs than the banks with a high Charge-Off ratio. More precisely, the banks that have low

lending performance will be more risk adverse and will not lend to the informationally opaque small businesses and start-ups that are more risky.

The other control variables in the regression are income per capita, the amount of assets per capita, amount of deposits per capita, human capital, and unemployment rate. This paper predicts positive impact of assets, income, and human capital on the number of loans to SMEs. As it was written before, the paper tries to prove the correlation between the level of economic activity in the county and the amount of small business loans in this county. The growth in assets, income, and human capital implies the growth of economic activity of the county, thus implying the higher number of loans to small businesses. Table5 summarizes all hypotheses that are tested in the paper. The predicted outcomes are always represented by the alternative hypothesis - H_a.

Table 5

Hypotheses	All counties	
Term	H_0	H_a
Regional economic and banking conditions:		
Income per capita	≤ 0	>0
Human Capital/Population	≤ 0	>0
Assets/Population	≤ 0	>0
Number of banks/Number of SMEs	≤ 0	>0
Unemployment Rate	>0	≤ 0
Deposits/Population	≤ 0	>0
Market "thickness" factors		
Number of SME/Population	≤ 0	>0
Births/Number of SMEs	≤ 0	>0
Deaths/Number of SMEs	≤ 0	>0
Banks' loan performance factors		
Charge-Off Index	>0	≤ 0
Performance Index	≤ 0	>0

To test these implications, we first use data for all counties and conduct an econometric panel data model with it. In addition, we are going to conduct another three tests. The first test is focusing on metro counties, the second focuses on micro counties, and the third examines the lending practices in rural counties. A metropolitan area contains a core urban area of 50,000 or more population. A micropolitan area contains an urban core of at least 10,000, but less than 50,000, population. And a rural area contains the area of less than 10,000 in population. This will allow us to investigate how does lending behavior change across the size of the county or its geography. Specifically, the significance of market thickness factors or local economic conditions may vary across the counties depending on their size. For example, paper hypothesizes that in rural counties the relationship lending is the most important factor in lending process and the local economic conditions and the degree of business activity does not play the same role as they may play in metro counties where the relationship factor is not so strong.

5. Empirical analysis

This paper estimates the model using data from 3110 counties in the United States. We find mixed results regarding whether the regression outcomes support the stated hypotheses. This suggests that aggregation of all counties in the regression may ignore important information and may alter the results.

Therefore, it is necessary to test for the structural differences between varying sizes of regional economies: metro, micro, and rural counties and whether it is meaningful to aggregate all sizes of counties in one data set. By conducting disaggregated tests on metro, rural, and micro counties it is possible to investigate how county size impacts lending. Then, we compared the results from the regression that uses aggregated set to the results from three disaggregated subsets. Given this comparison data can be used to analyze the significance county size has. After conducting tests on the micro, metro, and rural counties independently, it is apparent that aggregation neglects the differences amongst the size of the counties and that geography appears to be a significant factor in the analysis. Table 6 reports fixed-effect panel results for the aggregated set, which includes all counties. The results from the tests using metro, micro, and rural counties are presented in the Table 7. Table 8 provides elasticity for each factor in the model.

Table 6

	All Counties		
R^2 (within)	0.09		
	β	SE	t-stat
Regional economic and banking conditions			
Human Capital/Population	.0001357	.0001359	1.00
Unemployment Rate	0.111	0.0962	1.15
Income per capita	4.79e-07	3.39e-07	1.41
Assets/Population	-1.72e-08	2.00e-08	-0.86
Number of banks/Population	**3.27379****	**.7423867**	**4.41**
Deposits/Population	-6.75e-09	2.07e-08	-0.33
Market "thickness" factors			
Number of SME/Population	**-.0194621****	**.0038359**	**-5.07**
Births/ number of SME	.007308	.0182932	0.40
Deaths/ number of SME	.0236297	.0179589	1.32
Banks' loan performance factors			
Charge-Off Index	5.17e-07	1.64e-06	0.31
Performance Index	**.0347106****	**.0086632**	**4.01**

Table 7

	Metro counties			Micro counties			Rural counties		
R^2 (within)	0.028			0.20			0.27		
	β	SE	t-stat	β	SE	t-stat	β	SE	t-stat
Regional economic and banking conditions									
Human Capital/Population	-15.54	14.84	-1.05	**57.39****	**25.05**	**2.29**	**0.1025 ****	**0,0485**	**2.11**
Unemployment Rate	0.3	0.21	1.41	0.29	0.19	1.49	0.1373	0.12	1.14
Income per capita	-0.00012	0.0001	-1.02	-0.000017	0.0013	-0.13	**6.79e-07 ****	**3.01e-07**	**2.17**
Assets/SME	**2.02e-07*****	**6.12e-09**	**32.94**	**0.000111*****	**4.06e-07**	**27.42**	**-1.36e-09*****	**1.35e-08**	**52.77**
Assets/Population	0.00044	0.0017	0.25	**0.0391****	**0.01**	**3.75**	-1.24e-09	1.35e-08	-0.09
Deposits/Population	-6.70e-09	2.07e-08	-0.32	**.0503****	**.0135**	**3.71**	-9.12e-10	1.39e-08	-0.07
Number of banks/population	-1549.53	2333.4	-0.66	**3400.8****	**1588**	**2.14**	**110.757*****	**10.6970**	**10.35**
Market "thickness" factors									
Births/ number of SME	-24.14	11.98	-1.8	**28.88****	**9.55**	**3.02**	-.0068003	.0141958	-0.48
Deaths/ number of SME	14.05	12	1.17	-2.67	9.52	-0.28	.0132108	.0139515	0.95
Number of SME/Population	**92.83****	**25.02**	**3.71**	-0.0095	0.05	-0.17	.5263883	.3043614	1.73
Banks' loan performance factors									
Charge-Off Index	**-0.067****	**0.014**	**-4.71**	0.004	0.0164	0.26	.0040209	.0164003	-1.38
Performance Index	**0.227****	**0.047**	**4.76**	0.05	0.016	0.31	**.0562206*****	**.0096226**	**5.84**

Table 8. Elasticity

Variable	Metro counties	Micro counties	Rural counties
Income per capita	1.259e-07	-1.904e-08	4.567e-09
Assets/Population	1.288e-06	0.00020	-1.0443-11
SME/Population	-0.1239	-0.0141	0.003955
Banks/Population	1.1733	0.9976	1.0377
Human capital/Population	4.071e-08	-1.463e-07	0.0003647
Charge-Off Index	0.000091	2.415-06	0.000339
Perforance Index	-0.000148	-4.272e-06	0.00050659
Birthnorm=Births/Firms	0.0154	0.012599	0.00012115
Deathnorm=Deaths/Firms	-0.00667	-0.000221	0.00012115
Deposits/Population	-3.377e-07	0.000227	-8.510e-12

The results of the test show that the coefficients of assets and deposits per capita are positive and significant for micro counties (the population varies between 50,000 and 10,000 people per county.) With regard to the metro counties, the results suggest that bank's assets per capita and short-term liabilities don't affect the bank's propensity to lend in these counties. The same results appear to be true for rural counties. However, the assets per SME have positive and significant effect on SME lending in all three types of counties. This result is in line with the predictions of the hypothesis. The intuition behind this outcome is that the small community banks with high amounts of assets per SME are more likely to lend more to informationally opaque small businesses and start-ups as they can afford to offset the losses that may occur when financing

risky projects. In addition, those banks holding more assets are better able to diversify their portfolios, which in turn, can lead to more aggressive and risky investments in SME or start-ups.

The number of banks variable is positive and statistically significant in micro and rural counties. These results support the hypothesis of this paper that in markets with a less competitive banking environment, potential entrants or existing SMEs face greater difficulty gaining access to credit than markets in which banking is more competitive. These results also imply that market power may reduce the entry of small firms in the market, where relationship lending takes place, namely – in micro and rural areas. Banks with market power prefer to lend to their established borrowers rather than to the new borrowers, as it is more costly for banks to establish new relationship than maintain the old ones.

Another variable—human capital—has a positive sign and is significant for rural and micro counties, however, is not significant for metro counties. Therefore, small counties with high human capital are more likely to attract a greater number of loans. This result may also imply that more human capital in areas that have less economic activity increases attractiveness of the area in regard to SME lending.

The unemployment rate does not play the major role in the SME lending activity. The coefficient for the unemployment rate appears to be insignificant for all regression results. Income per capita is significant in rural counties only, implying that rural counties that have higher income will receive more credits

than the counties with the low income per capita. The rural counties with high income per capita will provide safer environment for investment. This result goes along with a human capital effect, where rural counties with higher amount of human capital will be viewed as more stable, less risky investment.

The bank's performance factors give mixed results across different counties. The charge-off index is significant and negative for metro counties. The negative effect can be explained by risk-adverse behavior of small banks. Small banks cannot afford to take a risk of lending to obscure small businesses or start-ups as a result of their financial situation and inability to recoup the future losses with their assets. In contrast, the charge-off index does not affect the lending practices in rural and micro counties.

When using Bank's Performance index as a second measure of banks financial standing the hypothesis stated that the banks, who have better overall financial performance, also have higher propensity to lend to SMEs. The results suggest that in the metro counties banks are more open to the risky investment or they have enough profit to offset the future losses. Specifically, the beta coefficients for metro and rural counties are positive and have significant impact on the number of small business loans, while it is insignificant for micro counties.

The possible explanation for these results can be derived from the financing policies in the specific counties or regions. It is likely that there are different policies concerning financing of SMEs. They may change across sectors, regions, county size, etc. One form of such policy is subsidiary. States authorities

may give subsidiaries to SMEs through the community banks. In this case, even though the investment in informationally-opaque small business may appear risky to the bank, it will give required amount of loan to the SME. However, this may disproportionally affect small banks because of the fixed costs of these policies. The existence of such policies can be the reason why the charge-off index in the rural counties doesn't have a negative influence on the amount of loans given to small enterprises.

Another hypothesis that was tested in this paper deals with the notion of asymmetry of information and market "thickness." The idea here is that in markets with a greater amount of previous information available regarding economic activity there is also a greater volume of loan origination in that geographic area. Banks and lending institutions see this previous information regarding economic success and failure as a signal for loan determination. Specifically, the counties with a high level of small business economic activity should be more likely to obtain credit from banks than counties with economic activity being low. The factors used in this paper that may reduce information asymmetry and determine the level of market "thickness" are number of start-ups, the number of closeouts of small businesses, and the total number of the SME per county normalized by population. We find mixed evidence on whether these factors can reduce asymmetry of information. The number of start-ups appears to have a significant positive effect in micro counties. Also, the number of small enterprises has a positive and significant effect on the number of loans in metro

counties. Both of these variables have insignificant coefficients for the rural counties. These results could indicate that in rural counties small firms have stronger relationships with their banks, consistent with a prediction of relationship effect, presented by Petersen and Rajan. In the larger counties the information concerning the birth and death of small businesses and the density of SME can be used as a proxy for the market “thickness” measurement. These factors can reduce information asymmetry between banks and borrowers in metro counties.

6. Conclusions

It is a common theory that SMEs lack hard quantitative information about their performance, which creates lending barriers. The aim of this paper was to uncover the factors that may be used as an informational signal for the banks and may induce the amount of loans to SMEs on the county level.

We used three different types of factors that may influence the banks' willingness to lend to the informationally opaque small enterprises—the regional economic and banking conditions in a county, the small business activity in the county, and the banks' financial condition. We test the hypotheses using Call-Report data from the Federal Reserve Bank from 1999 to 2006. Specifically, we conduct four sets of tests, which include metro, micro, rural, and overall county data. Using these sets of data we tested the significance of different economic variables in SME lending behavior across the regions. The first group of variables describes the economic condition of the county—income per capita, number of banks in the county, amount of assets per county, amount of deposits per capita, unemployment rate, and human capital per capita. The results of the tests indicate that the number of banks in the county and human capital have a positive effect on the number of SME loans given in small—micro and rural—counties. Firstly, higher bank competition produces larger amounts of small business loans in the county. Secondly, human capital appears to have a positive

and significant effect in small counties as well. Therefore, banks in small counties with high human capital are more likely to lend more to the SMEs.

Another hypothesis that was tested in this paper states that the number of loans given to small businesses is also connected with the notion of market "thickness" and the degree of business activity presented in a county. This paper tests to what extent the market "thickness" matters in bank lending practices. In a region with higher economic growth, a higher amount of SME loans is expected. This may indicate that the regions, where the business is expanding, will attract more small business loans. Of consideration is whether the information about the business activity in the county can induce banks to favor specific counties with a relatively higher degree of market "thickness." The number of births and deaths and the density of small businesses per population in the county are used as a proxy to measure market "thickness." The number of births and the density of SME appear positive and significant for large counties, which suggests that banks do, in fact, value this information in a highly competitive business environment. In the rural counties, however, these variables are not significant. This lack of significance can be explained by the prevailing importance of relationship lending practices in the regions with a relatively small number of SMEs and higher market power of banks.

The third hypothesis tested in this paper deals with the financial performance of banks. The tests showed that in the metro and micro counties financially distressed banks are less willing to lend to the informationally opaque

small businesses. In rural counties, however, the charge-off index appears insignificant. This may be due to the various policies that were established in order to support small businesses in the rural counties. These policies may provide subsidiaries for SMEs, so that whether lending bank is in financial distress is not as important. The overall bank performance has a positive impact on both – small and large counties, suggesting that the banks. This result even further supports the hypothesis that “successful” banks will be willing to lend to the small informationally-opaque businesses because it is easier for them to recoup the possible losses.

Overall, the paper confirms the importance of economic regional factors when dealing with SME lending. Through understanding the influence of these factors on small business lending, economists can develop effective practices that will support SME growth. In turn, this will encourage regional economic development and middle class society.